Hypertensive Patients and Their General Practitioners

Technical Report

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EXECUTIVE SUMMARY

Objectives

To examine the relative contribution of patients and physicians in selecting visit frequencies to manage hypertension and to assess the impact of different health care delivery systems within Canada.

Data Sources/Study Setting

Data for fiscal years 1997/1998 and 1998/1999 were abstracted from the Alberta Health and Wellness Population Registry, the Alberta Health and Wellness Insurance Plan Claims, Morbidity File, and Alberta Health and Wellness Stakeholder File.

Study Design

The study included 13,688 Edmonton hypertensive patients (aged 25+) and their 157 general practitioners (GPs).

Data Collection/Extraction Methods

Adult patients (aged 25+) were included if they had at least one physician claim reimbursement in each of 1997/1998 and 1998/1999 in which hypertension was diagnosed and the practice of their most frequently seen GP included at least 50 hypertensive patients.

Principal Findings

Edmonton hypertensive patients made an average of 9.5 annual physician visits. The analysis revealed that the variables contributing significantly to explaining the number of visits included: number of referrals, physician's patient recall rate, patient's mental health, comorbidities, hospital admissions, patient's sex, physician's sex, physician's age, and level of the continuity of care. Overall, there were no discernable differences in these factors between the two cities.

Conclusions

We found that the frequency of physician visits was primarily influenced by physician referrals (likely an indication that the patient had more complex health problems) and physician practice patterns, explaining about 80% of the total explainable variance in physician visits. The relative contribution of other available patient and physician characteristics in determining visit frequency was rather small.

INTRODUCTION

Much of a primary care physician's caseload is comprised of patients with chronic conditions requiring longitudinal care and therefore follow-up visits. Studies investigating the timing of primary care follow-up visits have found at least a threefold variation in revisit frequency for patients with common diagnoses such as hypertension, diabetes, musculoskeletal pain, and angina (Schwartz, Woloshin, Wasson et al., 1999; Petitti and Grumbach, 1993; Tobacman, Zeitler, Cilursu et al., 1992). While more frequent visits may lead to improved patient satisfaction with care (Weinberger, Oddone, and Henderson, 1996), there is no evidence that they lead to better patient outcomes.

Both patient and physician characteristics have been reported to be associated with greater health service utilization. Patients making more frequent visits to their physicians are more likely to be female (Verbrugge, 1985; Gijsbers van Wijk, Kolk, van den Bosch et al., 1992; Sayer and Britt, 1996), older (Rosenberg and Moore, 1997), less physically healthy (Lichtenstein, Sweetnam, and Elwood, 1986), and less mentally healthy (Health Statistics Division, 1998; Rosenberg and Moore, 1997). While physician characteristics such as age, sex, and years since graduation have been found not to be associated with the number of follow-up visits (Petitti and Grumbach, 1993; Tobacman, Zeitler, Cilursu et al., 1992), there is evidence to suggest that physicians have consistent scheduling tendencies (Schwartz, Woloshin, Wasson et al., 1999). This implies that physicians develop their own patterns (either during training or through experience) concerning the frequency of follow-up visits.

If variations in visit frequency can be attributed primarily to the physician's practice style, then user fees and deinsurance would be inappropriate to deal with the problem. This was the conclusion of a recent study involving hypertensive patients residing in Winnipeg, Manitoba (Roos, Carriere, and Friesen, 1998). Results of this study indicated that practice patterns and patient illness were the most important determinants of the number of primary physician visits. The variables found to be significantly related to number of annual physician visits included: number of referrals, mean number of visits with own hypertensive patients, having three or more serious medical conditions, whether the patient was hospitalized or not, continuity of care, number of mental health visits, neighborhood income level, and to a lesser degree with age of patients and physicians, and patient's sex (Roos, Carriere, and Friesen, 1998).

Hypertension was the eighth most common reason for visiting a general practitioner in Alberta in 1998/1999. A diagnosis of hypertension from physician claims data has been shown to be a valid and reliable indicator of hypertension (Muhajarine, Mustard, Roos et al., 1997; Roos, Carriere, and Friesen, 1998). The present study examines the relative contribution of patient and physician characteristics in selecting revisit frequency for managing hypertension. The factors influencing physician revisits in Alberta have not been studied previously and will facilitate regional comparisons between Alberta and Manitoba, two provinces with similar health care delivery systems, to validate previous conclusions about strategies such as deinsurance and user fees.

METHODS

Selection of Participants

For comparison and validation purposes, we defined hypertension patients as in the Manitoba study (Roos, Carriere, and Friesen, 1998). That is, we defined a diagnosis of hypertension based on International Classification of Diseases, ninth revision, code 401 on the physician claim for reimbursement. The following exclusion criteria was applied to select these patients from the approximately 650,000 Edmonton residents: a) aged 25 years and over; b) having at least one physician contact in each of the two fiscal years 1997/1998 and 1998/1999 with the

diagnosis under consideration; c) the physician with whom they had the most visits (most frequently seen physician) in 1997/1998 and 1998/1999 was then identified, and patients were excluded if they had fewer than two visits with their most frequently seen physician in each of the two years studied.

Further, patients were included in the study based on the following inclusion criteria regarding their most frequently seen physician: a) the physician must be a general practitioner; b) the physician must have practiced at least ten months in each of 1997/1998 and 1998/1999; c) the physician's practice must have included at least 50 patients diagnosed with hypertension during 1998/1999. This resulted in 13,688 hypertensive patients and their 157 primary care physicians.

Patient Variables

The Alberta Physician Claims database was used to collect the following patient characteristics: number of consultative referrals to other physicians in 1998/1999 (0,1-2, 3 or more); three or more serious medical problems: a serious medical condition was defined to be one of the ten conditions significantly related to health status (Pope, 1988; Roos, Carriere, and Friesen, 1998). Patients were identified as having a serious medical condition if they had at least two physician visits in 1998/1999 in which this condition was diagnosed. Patients were then categorized as to whether they had three or more serious medical conditions versus two or fewer of these conditions. We also consider incorporating number of mental health visits in 1998/1999, identified by one of a series of diagnosis codes (International Classification of Diseases, ninth revision, codes 290 through 319) in a particular visit to a physician. Upon establishing a unique patient-physician link, we estimated the continuity of care, which lies between 0 (low) and 1 (high), indicating the level of the sequential pattern of provider care (Steinwachs, 1979). For example, a patient who alternates between two physicians will have low continuity of care (a score of 0) while a patient visiting the same physician several times sequentially will have high continuity of care (a score of 1).

The Alberta Morbidity database supplied information on patient hospitalizations in 1997/1998 and 1998/1999. Patients were assigned to one of four groups: no hospital episodes during the two year period, admitted to hospital in 1997/1998, admitted to hospital in 1998/1999, or admitted to hospital at least once in each of the two years.

The 1998/1999 Alberta Population Registry database provided information on patient age, sex, and premium subsidy status (full, partial, and non-subsidized). Two indicators of a participant's socioeconomic status, based on income, were examined in this study. One indicator was the patient's Alberta Health and Wellness Insurance Plan premium subsidy status (full, partial, or non-subsidized). Low income Albertans and seniors were eligible for premium subsidies if, based on their adjusted taxable balance, they were unable to pay the total cost of their insurance premiums. As of December 31, 1998, there were 285,680 non-seniors and 141,871 seniors (of a total of 2,887,705 Alberta Health and Wellness Insurance plan registrants), receiving premium subsidies. In addition to premium subsidy status, we calculated another measure of socioeconomic status using 1996 census data as follows. Each study participant was linked via their postal code to a residential neighbourhood and assigned to one of five equal-sized income groups based on the average and dispersion of their neighbourhood income. As expected, there was a significant association between these two indicators. The proportion of fully subsidized participants decreased linearly from 58% to 29% as neighbourhood income increased (χ^2=577.53, p<0.001). The opposite trend was seen among non-subsidized patients (ie. proportion of non-subsidized participants increased with increasing neighbourhood income, χ^2=629.27, p<0.001). To make our study comparable to the Manitoba study, we used the socioeconomic status indicator based on neighbourhood income in this analysis.

Physician Variables

The physician characteristics were collected from the Alberta Physician Claims and Physician Stakeholder databases, which includes their sex, age, and year of graduation. Further, we calculated average number of patients seen per day in 1998/1999 (average over days where the physician saw at least two patients). Physicians were classified into three groups based on their total payments received in 1998/1999: those billing less than a full-time-equivalent (FTE) general practitioner ($150,000), those billing average to high ($150,000 to $272,600), those billing at a high rate (i.e. those billing higher than 1.5 FTE, or higher than $272,600). Based on the area of residence of the majority of the physician's patients, practice location was identified and dichotomized into lower income area (comprised of the two lowest of the five neighbourhood income groups) and elsewhere.

Statistical Analysis

We first attempted to model the data using a hierarchical model, also known as a random effects or variance components model, to recognize the within and between physician characteristics. Perhaps due to extreme heterogeneity within the physicians, the magnitude of the estimates did not differ very much from those resulting from simpler models such as multiple linear or logistic models. Therefore, we opted to use the simpler approach without misleading the results.

Model selection was done using the stepwise-selection methodology available in the SAS statistical package (version 7, SAS Institute Inc., Cary, NC, 1998). Using the SAS REG procedure, multiple linear regression analysis was used to examine the relationship between the number of physician visits and the patient/physician characteristics. Because the number of physician visits was skewed to the right, we employed the log transformation on the frequency of visits before proceeding with the multiple regression analysis. Logistic regression was used to examine the odds of making a high number of visits (ten or more) by each of the patient/physician characteristics. While the continuity of care measure was analyzed as a continuous variable, all other continuous patient/physician variables were categorized to facilitate interpretation.

In statistical modeling, half (6,844) of the 13,688 hypertensive patients were randomly selected for the analysis. Results were reported for this half of the patients (Table 3), and validated on the second half of the patients to confirm the stability of the estimates. We used 0.05 as the level of significance.

PRELIMINARY RESULTS

The majority of physicians (69%) saw their hypertensive patients not more than eight times, with only 32 physicians (20%) averaging six or less visits. There was a significant association between patient recall rate and physician's sex, with a greater proportion of female physicians tending to have lower recall rates and only nine of the 49 (18%) physicians in the highest recall rate group being female. While a relationship between recall rate and physician's sex was also found among Winnipeg physicians, Winnipeg had only 15 female physicians in

their study and an unexpectedly large number were in the highest (rather than the lowest) recall rate group. None of the other variables examined (age, relative billings, location, and average daily patient load), were significantly associated with recall patterns among physicians in either Winnipeg or Edmonton.

For each of the 157 physicians, the patient recall rate in 1998/1999 was compared to the patient recall rate in 1997/1998 to evaluate the reliability of this estimate. In each of the two years, hypertensive patients averaged 7.6 visits with their general practitioners. There was a strong positive association ($r=0.95$, $p<0.001$) between the recall rates, suggesting physician recall patterns tended to be consistent over this two-year study period.

To examine whether the recall rate for hypertensive patients was indicative of the physician's recall rate in general, the rate for hypertensive patients and the rate for other patients (excluding the hypertensive patients) was compared for each physician. Hypertensive patients, averaging 7.6 annual visits, made approximately twice as many visits to their general practitioners as other patients (averaging 3.4 visits per year). The association between the two recall rates was relatively weak ($r=0.45$), implying that a physician's recall patterns for their hypertensive patients was not necessarily indicative of their general pattern of practice.

All of the examined physician characteristics were assessed for their association with visit rates and making at least ten physician visits (Table 1). Elevated visit rates were evident for higher income physicians, males, and those practicing in low income neighborhoods. The number of visits was also above average for the oldest and youngest physicians, however the significance of this finding with regard to the youngest physicians cannot be stated fairly because there was only three physicians in this age group. Patients of physicians with high recall rates or higher volume practices tended to also have more than the average number of physician contacts in 1998/1999.

Edmonton hypertensive patients made an average of 9.5 physician visits in 1998/1999. Neighborhood income and most of the health-related patient characteristics were assessed for their association with the number of physician visits and the chances of making at least ten physician contacts. Compared to other patients, lower income patients had more frequent visits and a higher proportion (38%) made at least ten

physician visits. Both the physical and mental health of the patient appeared to be relevant, with the number of visits being higher than average for patients with three or more serious medical conditions, patients with at least one hospital admission, and those having one or more mental health visits. More frequent visits were also apparent as both the number of referrals to other physicians and the level of continuity of care increased.

To examine the association between visit frequency and continuity of care in more detail, the patients were divided into two groups: those with very high continuity of care (>0.9) and those with lower continuity of care (<=0.9). Compared to patients with very high continuity of care, the patients with lower continuity of care tended to visit physicians more often, with the exception of patients with three or more serious medical problems (Table 2). In general, those with low continuity of care tended to have a high level of physician contacts across other patient and physician characteristics.

Adjusting for Covariates

Overall, 27.5% of the total variation in the number of physician visits was explained by the variables. Keeping all other covariates constant, the number of referrals to other physicians accounted for the largest portion (13.6%) of the total variation in physician visits. This is likely indicative of a patient with more complex medical problems. An additional 6.7% of the variation in physician visits was explained by the patient recall rate. Next, the number of mental health visits explained an additional 4.2% of the variation. Having three or more serious medical conditions, being recently admitted to hospital, patient's gender, physician's gender, physician's age, and patient's level of continuity of care were the only other available variables contributing significantly to understanding the rate of physician visits. Repeating the regression on the second half of the sample yielded essentially similar results as the first half of the sample reported in Table 3.

Unlike Manitoba, income status of the patient and patient's age were only marginally associated with the visit rate. A similar set of predictors was identified in the logistic regression analysis as being important in identifying patients at increased risk of making ten or more annual physician visits (Table 3) as in Manitoba. That is, patients with two or more referrals to other physicians had over four times (OR=4.4, $p<0.001$) the odds of making at least ten physician visits (compared to patients

with no referrals). Patients of physicians with the highest recall rates had more than six times (OR=4.13, p<0.001) the odds of making at least ten physician contacts (compared to patients of physicians with the lowest recall rates). Also, the odds of making at least ten physician visits was about three times (OR=3.78, p<0.001) higher for patients with three or more serious conditions (compared to patients with two or fewer comorbidities), and for patients making two or more mental health visits (compared to patients making no mental health visits). The significant differences by both the patient's and the physician's sex in the Alberta study were not supported by the Manitoba results. When the logistic regression analysis was repeated on the second half of the sample, the magnitude of the coefficients was similar to those in the first half of the sample reported in Table 3.

DISCUSSION

One purpose of this study was to better the understanding of what determines the frequency of visits by Edmonton patients to their physicians. This is a first step towards developing strategies to understand physician visits and their determining factors. A second objective of the study was to make regional comparisons between Alberta and Manitoba, two provinces with comparable health care delivery systems (based on personal communication with Murray Werbeniuk of Manitoba Health and Shawn Malo of Alberta Health and Wellness, March 2000).

Hypertension, with an estimated prevalence of 15%, is a very common chronic condition requiring longitudinal care and periodic follow-up visits to a primary care physician (Joffres, Hamet, Rabkin et al., 1992). While the patients in this study made on average 9.5 physician visits in 1998/1999, the total number of physician visits in this period ranged from 2 to 99 among 13,688 patients. Over 80% of these patients saw their physicians more than the recommended two to four times considered necessary to manage patients with controlled hypertension (Moser, 1996).

Consistent with the previous research (Roos, Carriere, and Friesen, 1998), the findings of the present study suggest that, among the various patient characteristics examined, the characteristics indicative of patient health were most important in determining the number of physician visits. In addition, visit frequency was strongly associated with physician recall

rates. For example, the results of our study indicate that if physicians with the highest recall rates (rates over 8) reduce their rates down to those of physicians with the lowest recall rates (rates of 5 or less), the odds of a patient making ten or more physician visits may be reduced by up to 70%. The findings of our study also indicate that this change in practice patterns (reducing recall rates from the highest to the lowest levels) may result in almost six (5.6 visits on average) fewer annual visits for each patient of a physician with a recall rate of eight or above. For example, if each of the 4,345 patients of the 49 physicians with the highest recall rates in this sample reduced their annual visits by 5.6, this would result in a total of 24,332 fewer annual physician visits and an estimated saving of at least $524,111.28 (based on a family physician fee of $21.54 for an office visit). Because revisit frequency is strongly associated with patient illness and also with physician practice patterns, the findings of the present study support policies aimed at physicians rather than deinsurance and user fees. These conclusions are consistent with those of Manitoba, regardless of the different population distributions between the two provinces.

While Edmonton and Winnipeg are similar in size (approximately 650,000), Winnipeg had fewer hypertensive patients, despite the fact that more seniors reside in Winnipeg (88,810)(Statistics Canada Internet Site, 2000) than in Edmonton (84,145)(Statistics Canada Internet Site, 0 AD/3/1). Nonetheless, patient characteristics associated with more frequent visits in both Winnipeg and Edmonton were common: poor mental and physical health, and more referrals to specialists. In both cities, the physician variable that was significantly related to increased physician contact was high recall rates.

In both cities, the two variables most strongly associated with the number of physician visits were: 1) the number of referrals to other physicians; and 2) the patient recall rate. The number of mental health visits emerged as the third most important variable in Edmonton, while it was having three or more serious medical conditions in Winnipeg. Overall, only about 28% of the total variance in physician visits by hypertensive patients could be explained, thereby leaving much of the variance unaccounted for by these identified factors. Some of these unaccounted variables may involve other aspects of a physician's practice style. For example, some research has revealed that there is an association between a physician perceiving he/she is having a hectic day and scheduling more frequent return visits (Schwartz, Woloshin, Wasson et al., 1999).

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Similarly, in identifying patients at high risk of making at least ten physician visits, there was general agreement between the two cities. That is, patients at higher risk of making at least ten physician visits tended to be patients of physicians with high recall rates. They also had more referrals to other physicians, more serious medical conditions, and more mental health visits.

In addition to targeting physicians for their practice style and profiling, other strategies may involve changing the way health care is delivered. In Alberta, for example, generalist physicians are increasingly faced with reduced access to health care resources (both hospital and community based) but under pressure to provide care for sick patients. Alternative payment plans such as fee-per-patient, as opposed to fee-for-service, may be considered. For example, such alternative strategies may be worthwhile to consider for physicians caring for older or sicker patients, thereby allowing them to work as part of a health care team to offer a comprehensive package of services to those patients.

In interpreting the results of our study, it must be emphasized that while physicians may have consistently low or high recall rates in managing their hypertensive patients, it cannot be concluded that this is representative of their practice in general. Keeping this in mind, the findings of the present study suggest reducing physician visits in Alberta may involve policies and strategies to raise awareness among physicians with high recall rates and possibly by changing health care delivery. Policies aimed at the patient, such as user fees and deinsurance are not supported by the present study, consistent with findings in Manitoba.

TABLES

Table 1: Characteristics of Hypertensive Patients and Their General Practitioners

Characteristic	No. of Patients	Average No. of Visits to all Physicians	% of Patients Making ≥ Visits
PATIENTS			
All	13,688	9.5	36.1
AGE:			
25-44	784	9.8	35.5
45-64	4,483	9.2	33.4
65-74	4,265	9.4	35.2
75-84	3,010	9.9	41.4
85+	786	9.7	37.7
GENDER			
Female	7,930	9.5	36.7
Male	5,758	9.4	35.4
NEIGHBOURHOOD INCOME LEVEL			
Low	2,824	9.9	37.9
Medium Low	3,238	9.4	36.5
Middle	2,874	9.3	35.1
Medium High	2,624	9.5	35.7
High	2,128	9.1	35.0
NO. OF REFERRALS IN 1998/1999			
0	8,122	7.8	24.5
1	2,696	10.2	42.9
>1	2,870	13.5	62.7
HOSPITAL ADMISSIONS			
0	11,491	8.9	32.5
1997/1998	913	10.7	45.1
1998/1999	1,025	13.0	60.9
BOTH YEARS	259	15.3	67.6
SERIOUS MEDICAL PROBLEMS			
<3	13,239	9.1	34.5
≥3	449	19.9	83.5
NO. MENTAL HEALTH VISITS IN 1997/1998			
0	11,271	8.7	31.8
1	1,319	11.2	48.5
>1	1,098	15.0	65.6
CONTINUITY OF CARE IN 1997/1998			
Low	1,486	8.8	30.3
Medium	4,515	10.0	40.1
High	7,687	9.3	34.9

Table 1 (cont'd)

PATIENTS' PHYSICIANS AGE (No. Physicians)			
<35(3)	195	11.3	44.6
35-39 (23)	1,773	9.3	35.6
40-44 (40)	3,693	9.0	33.6
45-49 (29)	2,425	9.2	34.6
50-54 (19)	1,802	9.7	37.4
55-59 (27)	2,618	9.5	36.5
60 + (16)	1,182	10.7	43.7
GENDER (No. Physicians)			
Female (42)	3,262	8.7	31.9
Male (115)	10,426	9.7	37.4
AVERAGE NO. VISITS WITH OWN HYPERTENSIVE PATIENT IN 1997/1998(No. Physicians)			
≤ 5 (4)	267	6.4	15.7
5-6 (28)	2,153	7.3	22.1
6-7 (39)	3,450	8.1	28.0
7-8 (37)	3,476	9.2	36.2
> (4)	4,345	12.0	50.7
AVERAGE NO. PATIENTS SEEN DAILY (No. Physicians)			
≤24 (29)	1,974	8.8	30.5
24-29 (42)	3,771	9.1	34.0
30-34 (30)	2,730	9.4	35.8
35-39 (23)	1,828	9.8	38.8
40 + (33)	3,385	10.1	40.5
RELATIVE INCOME (No. Physicians)			
<Average (66)	5,495	9.2	31.4
Average to high (72)	6,514	9.1	34.6
Highest (19)	1,679	11.6	48.8
PHYSICIAN PRACTICE (No. Physicians)			
Low income neighborhood (70)	6,045	9.9	38.1
Elsewhere (87)	7,643	9.1	34.5

Table 2: Comparison of Patients with Low vs High Continuity of Care (1998/1999)

Characteristic	Patients with Low Continuity of Care (n=9069)		Patients with High Continuity of Care (n=4619)	
	Average no. of visits to all physicians	% of patients making ≥10 visits	Average no. of visits to all physicians	% of patients making ≥10 visits
PATIENTS				
All	10.1	41.1	8.2	26.3
AGE				
25-44	11.1	43.9	7.5	18.9
45-64	9.9	39.1	7.8	23.2
65-74	10.1	40.6	8.1	25.8
75-84	10.3	44.3	8.9	34.2
85+	9.9	39.7	9.1	32.2
GENDER				
Female	10.1	41.2	8.1	26.4
Male	10.1	40.9	8.2	26.2
NEIGHBOURHOOD INCOME LEVEL				
Low	10.6	43.6	8.6	27.4
Medium Low	10.1	41.6	8.0	26.4
Middle	9.9	40.1	8.2	25.2
Medium high	10.1	39.8	8.1	27.5
High	9.9	39.9	7.6	24.9
NO. OF REFERRALS IN 1998/1999				
0	8.4	28.5	6.9	18.0
1	10.4	46.1	9.6	35.8
>1	13.8	65.4	12.4	54.0
HOSPITAL ADMISSIONS				
0	9.6	37.4	7.8	23.9
1997/1998	10.8	46.7	10.0	32.7
1998/1999	13.1	61.8	12.7	58.5
BOTH YEARS	15.5	69.2	13.1	47.4
SERIOUS MEDICAL PROBLEMS				
<3	9.7	39.2	8.0	25.6
≥3	19.3	83.0	24.2	87.3
NO. MENTAL HEALTH VISITS IN 1997/1998				
0	9.3	36.3	7.7	23.9
1	11.7	52.4	9.8	37.3
>1	15.2	67.1	14.0	58.5
Patients' Physicians				
AGE				
<35	11.7	44.1	10.4	45.8
35-39	10.0	40.8	7.7	24.6
40-44	9.6	38.3	7.8	23.5
45-49	10.0	39.8	7.7	23.6
50-54	10.5	43.8	8.6	28.0
55-59	10.2	42.1	8.1	26.1
60+	11.1	46.9	10.1	37.3

Table 2 (cont'd)

GENDER				
Female	9.3	36.2	7.5	22.1
Male	10.4	42.7	8.3	27.5
AVERAGE NO. VISITS WITH OWN HYPERTENSIVE PATIENTS IN 1997/1998				
5	6.7	17.9	5.6	10.8
5-6	7.9	26.5	6.1	12.6
6-7	8.8	33.3	6.6	16.1
7-8	10.0	42.0	7.8	25.4
>8	12.8	56.4	10.5	40.7
AVERAGE NO. PATIENTS SEEN DAILY				
24	9.2	33.4	8.2	25.0
24-29	9.7	38.4	7.9	25.3
30-34	10.3	42.3	7.8	24.7
35-39	10.6	43.8	8.3	28.4
40+	10.8	46.0	8.6	28.9
RELATIVE INCOME				
<Average	9.7	38.5	8.1	25.3
Average to High	9.9	39.8	7.8	25.0
Highest	12.3	53.7	10.1	36.5
PRACTICE LOCATION				
Lower income neighborhood	10.6	43.2	8.5	28.0
Elsewhere	9.8	39.4	7.9	25.0

Table 3: Multiple Regression Analysis Results to Predict Physician Visits in

Characteristic	Total Visits* Average Difference	p-value	>9 Physician Visits Odds Ratio	p-value
PATIENT GENDER			1.00	
Male (reference)	0.00			
Female	0.04	0.001	1.15	0.016
NO. OF REFERRALS IN 1998/1999				
0 (reference)	0.00		1.00	
1	0.25	<0.001	2.10	<0.001
>1	0.45	<0.001	4.41	<0.001
HOSPITAL ADMISSIONS				
0 (reference)	0.00		1.00	
1997/1998	0.06	0.012	1.29	0.023
1998/1999	0.15	<0.001	1.84	<0.001
BOTH YEARS	0.18	<0.001	1.51	NS
SERIOUS MEDICAL PROBLEMS				
< 3 (reference)	0.00		1.00	
≥ 3	0.43	<0.001	3.78	<0.001
NO. MENTAL HEALTH VISITS IN 1997/1998				
0 (reference)	0.00		1.00	
1	0.16	0.022	1.78	<0.001
>1	0.35	0.025	3.01	<0.001
CONTINUITY OF CARE IN 1997/1998	-0.09	<0.001	0.73	0.005
PHYSICIAN GENDER				
Male (reference)	0.00			
Female	-0.07	<0.001	0.76	<.001
PHYSICIAN AGE				
40-44 (reference)	0.00		1.00	
≤ 35	0.17	0.001	1.55	NS
35-39	-0.02	NS	0.92	NS
45-49	0.012	NS	1.07	NS
50-54	-0.05	0.037	.081	0.027
55-59	-0.02	NS	.93	NS
60+	0.04	NS	1.04	NS
AVERAGE NO. VISITS WITH OWN HYPERTENSIVE PATIENTS IN 1997-1998				
5 or less (reference)	0.00		1.00	
5-6	0.13	0.009	1.64	NS
6-7	.021	<0.001	2.15	0.004
7-8	0.32	<0.001	3.33	<0.001
>8	0.52	<0.001	6.13	<0.001

* The data were analyzed upon a log transformation.

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